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DISEASES OF THE NERVOUS SYSTEM

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DISEASES of the NERVOUS SYSTEM
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A PRACTICAL JOURNAL ON PSYCHIATRY AND NEUROLOGY

Asymmetry in Occipital Electroencephalograms

OSCAR SUGAR, M.D.
Chicago, Illinois

The present study of asymmetry in side-to-side distribution of electrical activity in the human brain was undertaken because of the occurrence of striking examples of such differences in routine clinical electroencephalography.

Until quite recently, it was thought that "electrograms from bilaterally homologous areas, such as the right and left occipital, are almost identical" (12, p. 309). Case[2] stated "very roughly, and in general, the waves from the two occipital foci are equal and they appear and disappear together, and when one leads from one occipital focus to another, they frequently balance out." Gibbs[9] found no marked side-to-side differences in a study of 20 adults analyzed by shadowgraph technique, except for depressed 1-3 per second activity in the left temporal area. On the other hand, Raney[15] described marked unilateral differences in twins, with a slight tendency in normal individuals for the dominant hemisphere to show 1-15% less alpha amplitude and amount. Kornmüller[13] notes (p. 33), *"Es ist wichtig praktisch zu wissen, dass über hinteren Hirnabschnitten gewisse Seitenuntershiede physiologisch sind."* Later in the monograph he attributes these differences to *"schon grob anatomisch bezüglich der Occipitallappen verhältnismäszig starke Ungleichheiten."* There is also a section devoted to bilateral asymmetries in cerebral pathological states, which had previously been indicated by others.[2,10,16] There is, however, considerable confusion as to the significance of the so-called "minor" differences in hemispheric amplitudes and activity: they are usually considered of little clinical significance.[10,16]

Methods and Materials

Over 1000 patients were examined by means of a 4 channel electroencephalograph, using the standardized Army technique for electrode placement, time of recording, and basic interpretation as outlined in the appropriate War Department Technical Bulletin.[19] The interpretations and measurements were made by the author; the recordings were taken by a single trained technician. Voltages were measured with a micrometer caliper, and "alpha indices" obtained with a map measure according to the technique of Davis.[4] These measurements were made from day to day as the records were taken, primarily for clinical interpretation. Not until after recording had been completed were the records reviewed for diagnoses and measurements.

The diagnoses herein given are those of the referring physicians, and are not always necessarily those which would be obtained from years-long observations or from autopsies. The "normal" individuals are those used in a previous study;[17] they were se-

lected aviation cadets, with no personal or family history of nervous or mental disease, and with normal physical and neurological examinations. In order to rule out obvious sources of error, the channels and pens were alternated, electrodes were carefully checked and nearby accessory electrodes used to check observed variances.

The criterion of difference in amplitudes used in this study was based on the calibration (7 mm=50uV); a difference of at least 7 uV or 1 mm was selected as being significant. There is no statistically important difference in the results using this criterion and using a variation of 10% in amplitudes. For the alpha indices, a difference of more than 5 cm was considered significant. This was based on earlier work indicating that repeated measurements on a given strip of record were within this range of accuracy. The influence of selection of strips for measurement was minimized by using a strip with all leads on one side for comparing leads from front to back, and checking this with a strip of simultaneous recordings from the two sides. Where these values disagreed, a third strip was used and the results averaged. A disparity of at least 10 cm between two sides has been used in the study of the migraine cases in comparison with normals; the results are not statistically different from those with a 5 cm variation. There are discrepancies among the cases for which voltages and alpha indices are given, due to the presence of low voltage records in which indices could not be prepared, to failure to record exact figures in some of the reports, and to continuous dysrhythmias.

The subjects were adults 18 years of age or older, except for 10 aged 16 or less, most of whom had such dysrhythmic records that their figures have not entered into these calculations.

The following categories of disease were included in this study:

1.	Normals (selected normal adult males, aged 19-25)	26 cases
2.	Epilepsy (patients with paroxysmal seizures and loss or alteration in consciousness)	258
3.	Post-traumatic syndromes (including post-traumatic headache, encephalopathy, and neurosis)	217
4.	Psychoneurosis (including anxiety states, hysteria, etc.)	117
5.	Cephalalgia (patients with headaches not obviously due to injury, neurosis, or named cerebral pathology)	97
6.	Migraine (headache cases with usual visual and visceral symptoms, commonly with personal and family histories of migraine)	89
7.	Syncope ("fainting" in absence of history of epilepsy and without EEG evidence of epilepsy, and not obviously neurotic in origin)	61
8.	Neurocirculatory collapse (NCC) (individuals fainting at 18,000 feet simulated altitude without oxygen[17]	58
9.	Raised intracranial pressure (RIP) (Cases with papilledema, and diagnosed tumors, cysts, subdural hemorrhages, etc.)	28
10.	Infections (meningitis, meningoencephalitis, encephalomyelitis)	17
11.	Intracerebral disease (persistent and transitory hemiplegias, hemianopsias)	16
12.	Psychopathic personalities (individuals with normal physical and neurological examinations, so diagnosed by competent psychiatric examinations)	13
13.	Mixed organic diseases (fewer than 5 cases each of nystagmus, cerebellar disease, vestibular disease, birth injuries, multiple sclerosis, narcolepsy, neuritis, palsies, cerebral arteriosclerosis, frontal lobe disease, etc.)	58

As in the work of Straus, *et al.*[16], a ratio was obtained between the per cent time alpha on the greater side and that on the lesser side. For convenience, their term "index of asymmetry" (I.a.) may be used. A similar ratio was obtained for amplitudes. The percentage of each diagnostic group falling into the various indices was calculated, and these percentages compared statistically, using the ratio of obtained difference in percentages to standard errors of these differences[5, 14] and using Pearl's table B Appendix III[14] for estimation of the probabilities of these observations occurring by chance.

Results

The following tables give the distribution of cases among different disease categories, for different indices of asymmetry:

Table Ia. Distribution of indices of asymmetry for alpha activity in different diseases.

Table Ib. Distribution of indices of asymmetry for amplitudes in different diseases.

Table IIa. Percentage of cases in each category for given indices of asymmetry (alpha indices).

Table IIb.

In comparing the various categories statistically, it is found that the only striking differences were in the migraine, cephalalgia, NCC, raised intracranial pressure, and intracerebral disease categories. Table IIb. gives the ratios D/S.E. between the obtained differences and their standard errors for normals, epileptics (as a non-significant group) and the above categories. In parentheses the numbers give the propable occurrence of differences as great or greater than these by chance in 100 trials (Pearl).

Similar tables have been constructed for voltage asymmetries:

Table IIIa. Percentage of cases in each category for given indices of asymmetry (amplitudes).

TABLE Ia. *Distribution of indices of asymmetry for alpha activity in different diseases.*

I.a.	normal	epilepsy	posttraumatic syndromes	neurosis	cephalalgia	migraine	syncope	n.c.c.	r.i.p.	infections	psychopaths	intracerebral dis.	mixed organic dis.
1.0	22	192	155	89	65	51	45	35	16	15	11	4	46
1.1	1	19	16	7	11	10	5	7	1	1	1	2	2
1.2	1	11	13	6	6	6	2	3	2	1	1	1	3
1.3		9	10	7	6	11	2	5				2	2
1.4	1	5	7	2	4	4	2	2	1			2	
1.5		13	3	3	2	3	2	1	4				
1.6		3			1	2	1	2	1				2
1.7	1	1	3	3		1		1	2				
1.8			1		1		2	1					
1.9		2	1		1								
2.0			2					1	1			1	2
2.1													
2.2													
2.3			1			1							
2.4		1	1									1	
2.5													1
2.6													
2.7													
2.8													
2.9		1											
3.0		1											
3.3												1	
4.0*			4									2	
total	26	258	217	117	97	89	61	58	28	17	13	16	58

TABLE Ib. *Distribution of indices of asymmetry for amplitudes in different diseases.*

I.a.	normal	epilepsy	posttraumatic syndromes	neurosis	cephalalgia	migraine	n.c.c.	syncope	r.i.p.	infections	intracerebral dis.	psychopaths	mixed organic dis.
1.0	23	237	174	107	86	64	45	48	20	18	8	13	54
1.1	1	10	12	4	3	5	6	4	3	1	2		4
1.2	1	16	13	10	11	11	4	3	1		1		1
1.3		14	14	4	8	12	7	5	3		1	1	4
1.4		8	4	2	1	3	1	2	1		2		
1.5		3	6	3	1	4	1		1				2
1.6			2		1								
1.7	1		2						1				2
1.8		2	2				1						
1.9											1		
2.0											1		
2.1													
2.2													
2.3													
2.4			1										
2.5													
2.6													
2.7													
2.8													
2.9													
3.0			1										2
total	26	291	231	130	111	99	65	62	30	19	17	14	69

*These cases had no alpha activity on one side, and 20-40% alpha activity on the other side.

I.a. index of asymmetry. n.c.c. neurocirculatory collapse. r.i.p. raised intracranial pressure.

Table IIIb. Ratios (D/SE) and chance of probable occurrence in 100 trials for amplitude asymmetries.

In tables IVa and IVb are given the distribution of lateral dominance in occipital electroencephalograms measured by asymmetry in alpha activity and by asymmetry of amplitudes:

Table IVa.

Table IVb.

Table Va. Percentage of each category with dominance of one side or another (alpha indices).

Table Vb. Percentage of each category with dominance of one side or another (amplitudes).

Table VI. Lateral dominance tabulated against indices of asymmetry.

Figure 1 shows samples of normal distribution of waves from front to back and from side to side, at rest and before and over hyperventilation. Figure 2 shows instances of depression of occipital activity in cases of migraine.

Discussion

In contrast to Jasper[12] and in agreement with Straus, *et al.*[16] and Kornmüller[13], the above findings indicate a marked difference in homologous occipital encephalograms. Not only do 28.2% of these cases show marked differences in alpha activity of 10% or more, but 26.2% have variations of 20%

TABLE IIa. *Percentage of cases in each category for given indices of asymmetry (alpha activity).*

	normal	epilepsy	posttraumatic syndromes	neurosis	cephalalgia	migraine	syncope	n.c.c.	r.i.p.	intracerebral disease	infections	psychopaths	mixed organic disease
I.a.	26	258	217	117	97	89	61	58	28	16	17	13	58
= 1.0	84.6	74.4	71.4	76.1	67.1	57.3	13.8	60.3	57.1	25.0	88.2	84.6	79.3
> 1.0	15.5	25.6	28.6	23.9	32.9	42.7	26.2	34.7	42.9	75.0	11.8	15.4	20.7
> 1.1	11.5	18.6	21.2	18.8	23.0	31.4	18.0	27.6	39.6	62.5	5.9	7.7	17.2
> 1.2	7.7	13.9	5.2	12.8	15.5	24.7	14.8	22.4	32.1	50.6	0	0	7.7

TABLE IIIa. *Percentage of cases in each category for given indices of asymmetry (amplitude).*

I.a /	26	291	231	130	111	99	62	65	30	17	19	14	69
= 1.0	88.5	81.4	75.3	82.3	77.5	64.6	77.4	69.2	66.7	47.1	94.7	92.9	78.3
> 1.0	11.5	18.6	24.7	17.7	22.5	35.4	22.6	30.8	33.3	52.9	5.3	7.1	21.7
> 1.1	7.8	15.1	19.5	14.6	19.8	30.3	16.1	21.5	23.3	41.1	0	7.1	15.9
> 1.2	3.9	9.6	14.0	11.6	9.9	19.2	11.3	15.0	20.0	35.3	0	7.1	14.5

TABLE IIb. *Ratios (D/SE) and chance of probable occurrence in 100 trials for alpha activity.*

	epilepsy		cephalalgia		migraine		n.c.c		r.i.p.		intracerebral dis.	
I.a.	D/SE	(chance)	D/SE	(chance)	D/SE	(chance)	D/SE	(chance)	D/SE	(chance)	D/SE	(chance)
> 1.0	1.3	(19.36)	2.1	(3.57)	3.1	(0.194)	2.7	(0.693)	2.3	(2.14)	4.6	(0.00634)
> 1.1	1.03	(31.73)	1.5	(13.36)	2.5	(1.24)	1.9	(5.74)	2.3	(2.14)	3.6	(0.0318)
> 1.2	1.3	(19.36)	1.2	(23.01)	2.4	(1.64)	2.1	(3.57)	2.4	(1.64)	3.0	(0.270)

TABLE IIIb. *Ratios (D/SE) and chance of probable occurrence in 100 trials for amplitudes.*

	epilepsy		posttraumatic syndromes		cephalalgia		migraine		n.c.c.		r.i.p.		intracerebral disease	
I.a.	D/SE	(chance)	D/SE	(chance)	D/SE	(chance)	D/SE	(chance)	D/SE	(chance)	D/SE	(chance)	D/SE	(chance)
> 1.0	1.1	(27.13)	0.9	(31.81)	1.5	(13.36)	3.1	(0.194)	3.5	(0.0465)	2.1	(3.57)	3.0	(0.270)
> 1.1	1.3	(19.36)	2.0	(4.55)	1.8	(7.19)	3.2	(0.137)	1.9	(5.74)	1.7	(8.91)	2.5	(1.24)
> 1.2	1.3	(19.36)	2.3	(2.14)	1.6	(10.96)	3.0	(0.270)	2.0	(4.55)	1.9	(5.74)	2.6	(0.932)

or more between the two sides. The corresponding figures for amplitude variances are 22.2% and 16.5%. The comparable figures from Strauss's data are 24.8 and 17.7% of their total of 141 cases (89 "without pathology" and 52 with cerebral pathology).

The synchrony of waves spoken of by others[2] was markedly absent in the occipital areas in all groups studied. It was indeed rare to find simultaneous and synchronous bursts in the occipital areas, whereas synchrony in the frontal and parietal areas was very good in all groups in which there were no focal lesions in those areas. Less heed could be given to synchrony in temporal areas because of frequent appearance of muscle artefacts, but the impression was of considerable asynchrony. Most of the data presented by Strauss[16] are from parietal leads 4 cm behind the vertex and 7 cm from the midline which does not correspond to the standard leads used,[19] and direct comparison of the two sets of data is therefore not attempted.

In general, the directions (but not necessarily the amounts) of asymmetry were the same for alpha indices and for amplitudes. Thus, in the group of migraine cases, 17 in-

TABLE IVa. *Distribution of lateral dominance in occipital electroencephalograms measured by asymmetry in alpha activity.*

	normal	epilepsy	posttraumatic syndromes	neurosis	cephalalgia	migraine	mixed organic disease	syncope	n.c.c.	r.i.p.	infections	intracerebral disease	psychopaths	totals	% totals
l = r	22	192	155	89	65	51	46	45	35	16	15	4	11	746	71.2
l > r	2	24	21	10	8	14	4	3	3	6	0	2	0	92	8.8
l < r	2	42	41	18	24	24	8	13	20	6	2	9	2	210	20.0
total	26	258	217	117	97	89	58	61	58	28	17	16	13	1048	100.0

TABLE IVb. *Distribution of lateral dominance in occipital electroencephalograms measured by asymmetry in amplitude.*

l = r	23	237	174	107	86	64	54	48	45	20	18	8	13	897	77.8
l > r	0	21	21	11	6	7	8	4	8	6	0	2	0	94	8.1
l < r	3	33	36	12	19	28	7	14	12	4	1	7	1	163	14.1
total	26	291	231	130	111	99	69	62	65	30	19	17	14	1154	100.0

TABLE Va. *Percentage of each category with dominance of one side or another (alpha indices).*

	normal	epilepsy	posttraumatic syndromes	neurosis	cephalalgia	migraine	mixed organic disease	syncope	n.c.c.	r.i.p.	intracerebral disease	infections	psychopaths	totals
cases	26	258	217	117	97	89	58	61	58	28	16	17	13	1048
l = r	84.6	74.4	71.4	76.1	67.1	57.3	79.3	73.8	60.3	57.1	25.0	88.2	84.6	71.2
l > r	7.7	9.3	9.7	8.5	8.2	15.7	6.9	4.9	5.2	21.4	12.5	0.0	0.0	8.8
l < r	7.7	16.3	18.9	15.4	24.7	27.0	13.8	21.3	34.5	21.4	62.5	11.8	15.4	20.0

TABLE Vb. *Percentage of each category with dominance of one side or another (amplitudes).*

cases	26	291	231	130	111	99	69	62	65	30	17	19	14	1154
l = r	88.5	81.4	25.3	82.3	77.5	64.7	78.3	77.4	69.2	66.7	47.1	94.7	92.9	77.8
l > r	0.0	7.2	9.1	8.5	5.4	7.1	11.6	6.5	12.3	20.0	11.8	0.0	0.0	8.1
l < r	11.5	11.4	15.6	9.2	17.1	28.2	10.1	16.1	18.5	13.3	41.1	5.3	7.1	14.1

dices for alpha activity and for amplitude did not agree in that both were not over 1, but in all cases, the same side of the head had more of both, or less of both indices. In general, the alpha indices were apt to show the greater differences. That this holds for other groups of cases is shown by comparing Tables IIa and IIIa: the former has the lower percentage of I.a. = 1. Under the conditions of this study, alpha distribution would seem to be a more delicate indicator of asymmetry than amplitude differences although both are in the same direction.

For all cases, there was relative depression of the left side more frequently than of the right side, both in alpha activity and in amplitude height (Tables Va. and Vb.). The odds against this occurring by chance are very great (D/S.E. = 7.4 and 4.6 respectively), over 1 million to 1.

With regard to asymmetry in distribution of alpha activity in individual groups of cases, it is seen that the only ones in which significant differences arise are those of Tables IIb and IIIb. There is no significant over-all asymmetry for epileptics, neurotics, syncopal cases, infections, psychopaths, or in the group of miscellaneous organic diseases. Some of the post-traumatic cases present the greatest individual differences between the two sides, and have the most accurate predictive value except possibly in the intracerebral disease category. Though a more accurate weeding out of the neurotics could have been made in the group of post-traumatic syndromes, the percentage of significant asymmetries would have been very high.

The significant number of asymmetric records in groups with raised intracranial pressure and intracerebral disease would have been anticipated in view of the present knowledge of focal and mass lesions and their effects on the EEG. It is possible that masses interfere with blood supply reducing cerebral activity[11, 18, 21] and that interruption of certain pathways might of itself interfere with alpha activity.[2]

TABLE VI. *Lateral dominance tabulated against indices of asymmetry.*

	A. ALPHA ACTIVITY				B. AMPLITUDE				
I.a.	l=r	l>r	l<r	total	l=r	l>r	l<r	total	I.a.
1.0	746			746	897			897	1.0
1.1		28	55	83		33	22	55	1.1
1.2		21	35	56		19	43	62	1.2
1.3		16	38	54		27	46	73	1.3
1.4		6	23	29		7	17	24	1.4
1.5		8	23	31		6	15	21	1.5
1.6		5	4	9			3	3	1.6
1.7		3	8	11			6	6	1.7
1.8			5	5		5	1	4	1.8
1.9		1	1	2		1		1	1.9
2.0		1	8	9			1	1	2.0
2.1									2.1
2.2									2.2
2.3			2	2					2.3
2.4							1	1	2.4
2.5		2	2	4					2.5
2.6									2.6
2.7									2.7
2.8							1	1	2.8
2.9									2.9
3.0		1		1			4	4	3.0
3.3			1	1					3.3
4.0				4					4.0*
4.0*			4	4					
Total	746	92	210	1048	897	84	163	1154	
%	71.2	8.8	20.0	100	77.8	8.1	14.1	100	

* no alpha activity on one side at all

Except for the foregoing categories, there were more asymmetries in the migraine group than in any other. This is difficult to account for an *a priori* basis. If one accepts the current hypothesis of the vasoconstrictor origin of the neurological symptoms of migraine[7, 8, 20] and recalls the depressing effect of anemia on cortical activity,[18] it is possible to hypothecate that these electrical differences are due to differences in blood supply to the occipital lobes (without regard to the mechanism of how the vasoconstriction is mediated). These asymmetries may not be present in every record taken from a given individual. At times, the depression of occipital activity may be transitory, lasting minutes or even seconds (figure 2c, d). The absence of clinical symptoms at the time of this depression may be due to the brief duration of the phenomenon, or as Engel[6] has suggested, because it takes place in a relatively silent area (the standard occipital electrode placement is anterior to the visual cortex proper). At times there is associated with this occipital depression a delay in or absence of the typical response to opening and closing of the eyes, invariably on the side of the depressed activity. This too may be present in certain stretches of one record and absent in others.

Why the occipital lobes should be more susceptible to these transitory or more permanent variations is unclear and why the left more than the right by more than 2:1

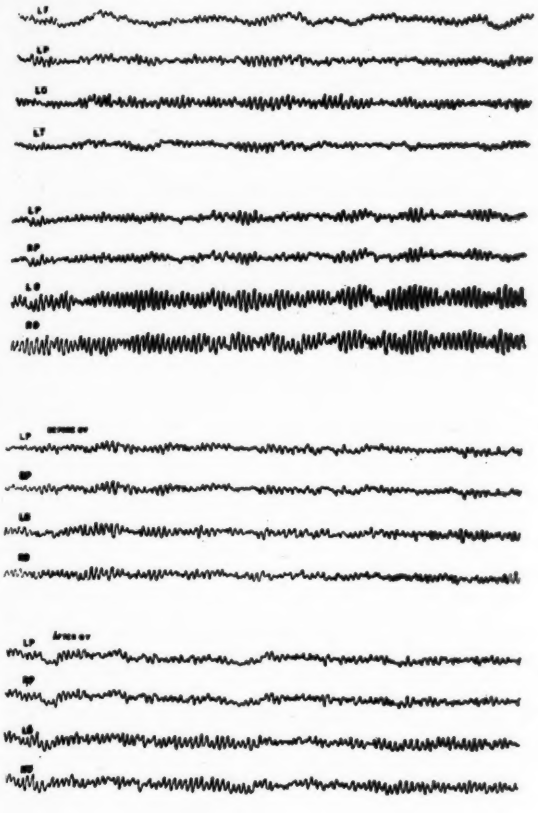

Figure 1.

a. Normal distribution of waves from front to back on left side.

b. Normal distribution of waves from side to side in parietal and occipital areas.

c. Normal symmetry before hyperventilation.

d. Normal symmetry after hyperventilation.

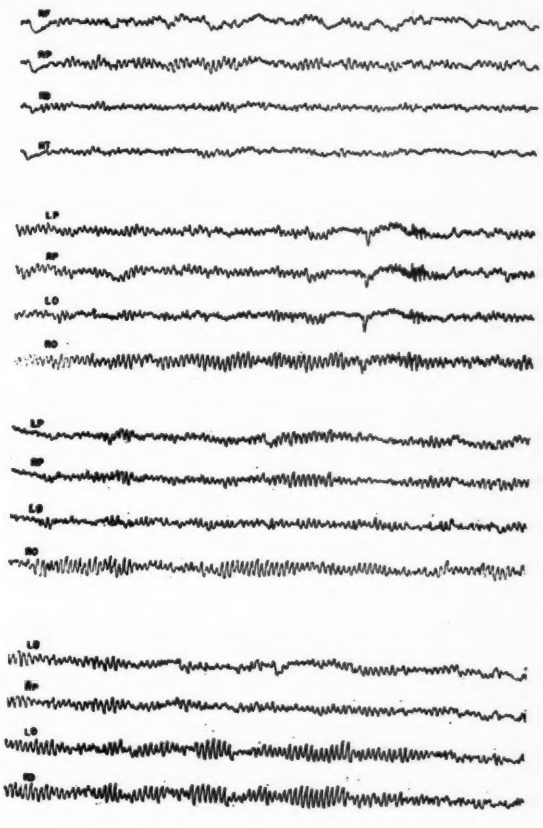

Figure 2.

a. Depression of occipital activity in case of migraine (right side).

b. Depression of occipital activity in case of migraine (left side).

c. Transitory depression of left occiput in case of posttraumatic cephalalgia.

d. Same case as 2c., 100 seconds later (no change in recording conditions).

is also beclouded. Certainly no such variations are seen in the parietal and frontal areas (less than 0.5% of these cases) unless there is associated intracranial disease of some magnitude, or unless there is also occipital depression on the same side. When these "functional" asymmetries were found, there was a history of typical migraine or recurrent headache with a transitory hemiplegia. The obvious clinical deduction of subarachnoid hemorrhage was rejected in view of the absence of blood in the cerebrospinal fluid and the rapid recovery.

Case Reports

Case 1. E.W.K., a 23 year old white male was admitted to an Army Air Forces Regional and Convalescent Hospital on July 8, 1945, some minutes after the following incident. While drinking a soda, he suddenly developed severe sharp pain throughout the right side of the head. He became dizzy, objects whirled about him and he became weak, confused, disoriented, and temporarily lost his memory. At the hospital he was still dazed, confused, talked in a halting manner, and complained of severe right parietal headache, blurred vision, nausea and he vomited once. There were no twitchings or incontinence. Previous similar attacks were denied. There was a history of frequent migraine headaches since the age of 14 (confirmed by independ-

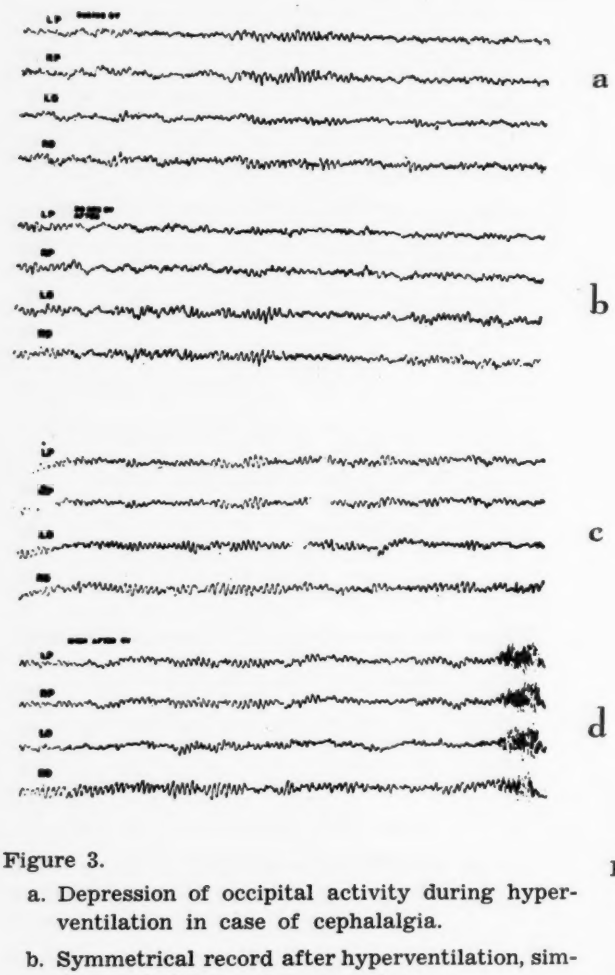

Figure 3.

a. Depression of occipital activity during hyperventilation in case of cephalalgia.

b. Symmetrical record after hyperventilation, similar to that before hyperventilation.

c. Normal distribution of waves from side to side in case of "epilepsy" (seizures consisting of dizzines, nausea, and vomiting; probably an atypical migraine).

d. Depression of left occiput, same case as 3c., due to hyperventilation, and disappearing within 1 minute.

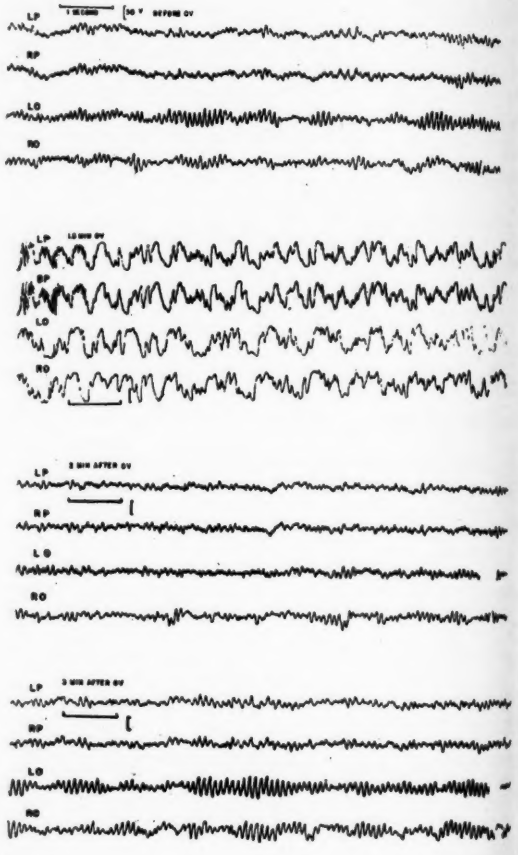

Figure 4.

a., b., c., d. Variation in occipital activity before, during, and after hyperventilation in a case of migraine.

Abbreviations and calibrations:

LF, LP, LO, LT—Left frontal, parietal, occipital, and temporal areas.

RF, RP, RO, RT—Right frontal, parietal, occipital, and temporal areas.

OV—Overventilation (= hyperventilation).
calibration—50uV (= 7 mm in original record).
time signal—1 second (= 3 cm in original record).

ent sources), and one sister also had migraine. Physical examination revealed nystagmus, incoordination of the right upper extremity, and confusion. The neurosurgeon diagnosed a psychosomatic vasomotor syndrome after failure to find blood in the spinal fluid. The psychiatrist considered this a migraine in which a more severe-than-usual vasospasm involved a more anterior area. An elecroencephalogram revealed marked depression of the left parietal and occipital areas and was interpreted as compatible with vasospasm. All symptoms disappeared completely within 2 days except for the headache, which lasted a week.

Case 2. R.Mc.A., a 20 year old pilot, returning from a routine low altitude training flight, on stepping to the ground experienced headache and paralysis of the right arm and leg. He was immediately hospitalized where signs typical for right hemiplegia were observed. These disappeared within 12 hours. Spinal fluid and other examinations were within normal limits. Electroencephalograms done at intervals between 1 week and 6 months all revealed depression, averaging 20%, in the left occipital EEG. A slighter parietal depression disappeared after the first record and never reappeared: It could not be reinvoked by hyperventilation, adrenalin, histamine, or hypoglycemia. There were no seizure discharges in the EEG and no history of epilepsy.

In few cases was it possible to obtain a recording during a headache among these migrainous individuals. However, such records were no more unusual than those done in a headache-free interval. No records were taken during scotomata or in the presence of other prodromal symptoms.

In some cases asymmetry occurred either during hyperventilation and not before or after (figure 3), or was present in the resting record and not during hyperventilation (figure 4). It was noted that in many of the cases of asymmetry in migraine, there was a moderate or large build-up on hyperventilation.

The relatively high incidence of asymmetry in neurocirculatory collapse cases (which are allied to fainting at the sight of blood) and in cases in which headache was the predominant symptom, might be related to some increased vasomotor lability in these individuals, in which the cerebral vessels also participate. It would be interesting to see if "normal" individuals with considerable electroencephalographic asymmetry would be more apt to develope headache as a symptom of emotional turmoil than "normals" without such asymmetries (based on the hypothetical vasodilatation of extracerebral vessels as a reciprocal of vasoconstriction in the intracerebral vessels).

Few experiments were attempted with vasodilator and vasoconstrictor drugs on these asymmetries. There are some indications that the asymmetries change after employment of some of these drugs (and that the EEG changes could be used to test certain drugs for their effects on cerebral vessels).

In the absence of organic masses, if asymmetries could be strictly interpreted as vascular in origin, their presence in post-traumatic cases would be more readily explained. If the dizziness and headache following head injury is to be explained on the basis of "temporary vasomotor paralysis" and similar abnormalities in the blood circulation of the head,[1,3] then one might expect peculiarities in the EEG where these might be due to vascular phenomena. That there were not more such asymmetrical records in this group of post-traumatic syndromes may well be due to the inclusion of many cases of neurosis in which the degree of head injury is uncertain, and also inclusion of cases in whom EEG was requested to rule out the possibility of post-traumatic encephalopathy prior to restoring them to duty, and who were without symptoms at the time of the recording.

Other signs of occipital depression not studied in detail included the depression of the on-off light responses, bilateral occipital depressions compared to other leads, etc. In some individuals, parietal records have more alpha activity or more voltage than occipital records. There seemed to be more of these cases in the headache and migraine groups than in others, but these criteria were not explored in the foregoing study.

The non-appearance of great asymmetry in epileptics hints that the vascular changes in non-symptomatic epilepsy are not particularly extensive (agreeing with the concept that cortical anemia is not the usual spark for the epileptic fire). From this standpoint too, there would be little relationship between migraine and epilepsy.

Summary and Conclusions

1. Monopolar recordings of occipital electroencephalograms of over 1000 patients were analyzed for asymmetry in per cent time alpha and average maximum occipital voltage.

2. In cases of migraine, neurocirculatory collapse, cephalalgia, intracranial masses and intracerebral disease such as hemiplegia and hemianopsia, asymmetries appeared in numbers which are statistically significant as compared to normals. No such significant results were obtained with epileptics, psychoneurotics, psychopathic personalities, post-traumatic syndromes, infections of the nervous system, and individuals with syncope.

3. Twenty per cent of the cases had depression of the alpha activity of the left occiput; 8.2% had depression of the right occiput, and 71.2% had equal amounts of alpha activity on the two sides. The corresponding figures for amplitudes were 14.1, 8.1, and 77.8%.

4. Individual waves and groups of waves were not found to be synchronous in the occipital records (as they were in frontal and parietal records) of these patients.

5. In the absence of gross cerebral abnormalities, such depressions of amplitude and alpha activity may be due to diminished blood supply to the affected side. The presence of such asymmetries is considered to be an aid in the diagnosis of migraine and other disorders of cerebral circulation.

AUTHOR'S NOTE: I wish to extend thanks and appreciation to my technician, John F. Seibert for his considerable aid in this investigation, to Willard Huntzinger who photographed the original records and to Dr. F. A. Gibbs for his constructive criticism.

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Relationship of Psychiatry to Problems of Medical Care *

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The fact that adequate medical and hospital services are not available in much of the rural United States is one of the most important problems facing American medicine. The expanding effectiveness of medicine as well as the needs of our people dictate that the problem must be solved, and in seeking the solution it must be realized that both the communities needing help and the medical profession must assume certain responsibilities.

While a full discussion of community responsibility would involve many considerations, only one will be pertinent to this paper—the necessity for the provision of modern hospital and diagnostic facilities. Our medical men are trained in the atmosphere of the well equipped hospital and diagnostic laboratory. Medicine to them, while still an art, is also a science, and when they enter practice they quite naturally desire the facilities and the tools they have learned to appreciate and depend upon.

While the provision of modern buildings and equipment will be essential if medical men are to be attracted to rural practice, the situation in a given community will be far from satisfactory unless the number of men is such that time will be available for study, relaxation and family life and also unless their various talents add up to a comprehensive medical service that will be reasonable for that community. In other words, a satisfactory solution to the medical needs of the average rural community will depend upon the availability of modern diagnostic and hospital facilities and upon available medical personnel so trained and so distributed as to provide a reasonably complete and well balanced professional service. The provision of such personnel is the responsibility of the medical profession.

In general it must be recognized that programs aimed at the provision of a well balanced professional service will contain many variables which in turn will depend upon the varying needs of differing communities and also upon the varying ideas and methods of the physicians who will serve these communities. Undoubtedly we will see many versions of group practice. We will see isolated communities attempting to provide more comprehensive care for their people by teaming up with adjacent communities in sharing health units and small emergency hospitals, which in turn will be contributory to a small general hospital where consultation will be adequate for at least the average acute problem. To accomplish its purpose such a system will depend upon well trained, competent medical personnel, good equipment and satisfactory transportation facilities. Regardless of the various solutions and changes that will be attempted we will still retain to a considerable degree our present way of doing things, namely, the independent practice of the individual, or individualistic, physician who will render a well balanced service by resorting to consultation with, or referral to, his fellow physicians according to the dictates of his judgment as to what is best for his patient.

Since every region or organ of the body is frequently involved in the expression of personality disorder all physicians, regardless of specialty or major interest, examine and prescribe for many patients suffering from such conditions; and since psychiatric concepts and methods are still poorly understood by most of our physicians and since psychiatric specialists are comparatively few the public, urban as well as rural, is far from realizing the full benefit of psychiatric medicine. To put it bluntly this statement means two things: one, personality illness is very common and two, we now have effective methods to prevent and treat such illness. If these two statements are true it is reasonable to also state that the practical benefits of psychiatry should be as readily available to our people as we intend to make the benefits of medicine and surgery. Con-

*From the Department of Medicine, University of Colorado School of Medicine. Read before the Central Neuropsychiatric Association, Denver, Colorado, October 5, 1946.

sequently, regardless of the *modus operandi* for the extension of well balanced professional service every physician, whether he be general practitioner or specialist, must deal intelligently with the psychiatric aspects of his practice.

In a consideration of comprehensive medical care the formal recognition of psychiatric concepts and methods presents difficulties that require realistic evaluation and solution. The difficulties encountered involve the public, the general medical profession and the psychiatric specialist.

As far as the general public is concerned we recognize that fear, ignorance, prejudice and a sense of shame frequently complicate the psychiatric approach to many problems. The uninformed often think of the physician and his neurotic patient as quack in the first instance and malingerer in the second. The pair are constantly made to appear in an unfavorable light in court trials, movies, novels and cartoons. It is inevitable that these archaic attitudes on the part of the public will subside, and as this takes place it will be the responsibility of the medical profession to be in a position to satisfy the ensuing demand for adequate psychiatric care.

The general practitioner and the nonpsychiatric specialist often contribute to the difficulty because of their patient approach. The undergraduate education of most of the practicing profession has been both quantitatively and qualitatively deficient in psychiatric instruction. Consequently too often clinical thinking is in terms of disease entities to the exclusion of a consideration of personalities and individuals. The consideration of personality illness only after organic disease has been ruled out by exhaustive physical and laboratory examination, the management of such cases by relying on sedatives, tonics and surgery, or the summary discharge of the patient with the statement that nothing is wrong, constitute but a few of the evidences of the resultant lack of psychiatric understanding on the part of most of the practicing profession.

The psychiatrist himself plays a role in creating the difficulties. Historically he has been associated largely with the treatment of the major psychoses in the insane hospitals. His research, until recently, has been carried on independently of other branches of medicine. His terminology and concepts have been beyond the understanding of the average patient and practitioner. Until recently his only close association with the other medical specialties has been in institutions, medical schools and large clinics. Even though many communities have competent psychiatrists engaged in private practice they are not in a position to be introduced to most of the patients needing their services.

Thus, unfortunately, psychiatry has been set aside as a more or less independent branch of medicine, and since it is now recognized that all phases of medical practice involve a high degree of psychiatric understanding, it is important that its compartmentship as a specialty be done away with. The solution to this problem is fundamentally one of education—education of the public, the practicing profession and the men and women undergoing basic medical training. The proper integration of psychosomatic and psychiatric concepts into a comprehensive medical service will proceed in direct proportion to the success of this educational process. Since education of the public is primarily a responsibility of the medical profession, and since the education of the profession is largely the responsibility of our medical schools, it is time for medical educators to completely re-evaluate their aims and at the same time to make changes in their methods of teaching that will be consistent with these aims.

The whole medical curriculum, not just the psychiatric part of it, needs to be put through the washing machine. Briefly, this new curriculum should be built about the consideration of the total individual. He should be considered first from the standpoint of normal structure, normal somatic function and normal personality function, and second from the standpoint of abnormal structure, abnormal somatic function and abnormal personality function. Clinical considerations should then be carefully integrated into the understanding of the normal and abnormal individual so that the various disease entities will be understood in proper relationship to the individual in whom the

disease resides.

The diagnosis and definitive treatment of disease is now spoken of as the second phase of medicine. The first phase, prevention of illness, and the third phase, rehabilitation from illness, have been greatly neglected. Consequently this revamped curriculum must emphasize all three phases of medicine, and these in their proper relationship to the problems of our total individual.

Finally, this curriculum must give consideration to the importance of developing medical students so that by the time they graduate they will have come by mature and stable points of view and philosophies that will be consistent with the part that the physician must play in our total society. It should go without saying that the medical man who, because of his knowledge of psychobiology and psychopathology, has gained insight into the mechanism of his own life and into the lives of his family, friends and patients, will have an intelligent and broad understanding of society in general.

If medical students were taught as if they were all going into general practice we can see a reasonable limit to the goal of undergraduate medical education. This is a justifiable limitation, because the general practitioner will always be the backbone of our system of medicine, and also because the educational needs of the general practitioner will always be a prerequisite for specialization. Psychiatrically speaking the general practitioner is usually the first to contact the patient with personality difficulty, and by virtue of this fact he becomes a most important cog in the machinery of comprehensive medical service. But since all medical men, whether they be general practitioners or specialists, cannot avoid meeting and dealing with emotional illness it becomes apparent that the interests of a well balanced medical service make considerable psychiatric ability a "must" for all physicians. How much psychiatry should the general practitioner or the nonpsychiatric specialist know? The answer to this question could well be the subject of a separate paper. We should teach psychobiology, psychotherapy and clinical psychiatry in such a way that our new graduate should be able to recognize the common manifestations of personality maladjustment; he should understand the mechanisms involved; he should understand the use of the everyday principles of psychotherapy. If we can do this much for our student we need not worry about his ability to evaluate his patients from the psychosomatic standpoint and to see that they obtain proper consideration and treatment.

How can our medical students and medical men be taught this practical type of psychiatry? An attempt to offer an adequate answer to this question in a few sentences would obviously be presumptuous, but a practice now in vogue in a few schools of medicine, the University of Colorado being one of them, points the way to the answer. In 1934, through the interest of the Rockefeller Foundation, a psychiatric liaison with the Department of Medicine was established at the University of Colorado School of Medicine. It was at once apparent that this provided a realistic medium for the teaching of "every-day" psychiatry to our medical students. Since psychosomatic problems are so common to all phases of medical practice, it is planned to carry the psychiatric liaison idea into each of these four major fields of medicine, to wit: pediatrics, surgery and obstetrics, and gynecology. There will be no separate psychiatric service. The medical student will learn most of his clinical psychiatry in the realistic atmosphere of the general hospital ward and outpatient clinic and not in the psychopathic hospital where advanced and irreversible problems are so frequently encountered.

The summary of this paper can be stated very briefly. Comprehensive medical care will be solved as the result of comprehensive basic medical education. Adequate psychiatric care for our people will depend upon our placing the practical tools of clinical psychiatry in the hands of all of our doctors —specialists as well as general practitioners. This type of psychiatry, given a sound background of psychobiology and psychopathology, will depend not upon lectures and demonstrations but upon the close supervision of the student who is working with the individual patient and his problems.

Histamine Treatment of Cerebral Arteriosclerosis*

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Histamine has long been known for its property of rapidly dilating the entire capillary field with constriction of the arterioles and causing a marked fall in blood pressure. Because of this profound cardio-vascular reaction, we attempted to treat nine cases of psychosis with cerebral arteriosclerosis with large doses of this drug, hoping to improve the cerebral circulation.

The preparation used was histamine phosphate made up in special 6 mg. ampules. This was given intramuscularly in the following dosages: 1st dose 3 mg.; 2nd dose 6 mg.; 3rd dose 9 mg.; 4th dose 12 mg. The treatment was given following the technique of Hill,[1] and a small amount of insulin was given with each injection: U 10 up to 9 mg. and U 20 after that. Within five minutes there is a flushing of the entire body. This usually begins on the face and shoulders and spreads to the torso. It may be absent on the legs. Along with this, there is a rapid fall in blood pressure, both systolic and diastolic, dropping with a greater decrease in the systolic pressure causing the pulse pressure to become less. The patient frequently complains of headache. Occasionally, there is pain in the legs, a disagreeable taste in the mouth, the eyes are often noted to glisten and there may be an emotional reaction.

During the treatment the blood pressure is taken every ten minutes until it reaches approximately the level it was before the treatment. The patient, of course, must remain in bed during the entire treatment as there is danger of cardiac collapse. Following Hill's Technique, the treatment was given every day for a week and then every other day until fifteen treatments were given. A rest period of two to three weeks was allowed and treatment was begun again.

Eight patients completed the course of treatment, one being removed from the hospital before completion of treatment. Of these eight patients completing treatment, the blood pressure taken resting in bed early in the morning, showed a systolic range from 218 to 160, with a mean of 182; the diastolic ranged from 140 to 82, with a mean of 108. During the treatment, there was a mean systolic drop of 65 (Maximum 110; Minimum 20) and a diastolic drop with a mean of 40 (Maximum 64; Minimum 12). The mean pulse pressure before treatment was 64. During the treatment it dropped to a mean of 42. These changes in blood pressure occurred only during the treatment and did not last over twenty minutes. There was no permanent change of any significance in either the systolic, diastolic or pulse pressures.

Four patients during treatment exhibited symptoms of an acute coronary occlusion. This was confirmed by electrocardiographic tracings and sedimentation tests. They all responded, however, to appropriate medication. The acute symptoms of the coronary syndrome occurred between the twentieth and twenty-fifth treatment.

From a psychiatric viewpoint, there was no difference in symptomology during or after the treatment. A battery of psychological tests,[2] given the patients before and after treatment, showed no evidence of any improvement and the test performances were approximately the same before and after treatment, except that one case showed more confusion and poorer performance on the second examination. Of these patients, all are still living eight months after the completion of the treatment.

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*From the New Jersey State Hospital.

[1] Histamine and Insulin Treatment of Schizophrenia, Horace Hill, M.R.C.P., Williams and Wilkins Co., Baltimore, 1940.

[2] The Psychological Tests used were: Kent Oral Emergency; Scrambled Words (Kuhlman-Anderson Test No. 18); Wechsler Arithmetic Reasoning; Binet Paragraph Memory (at 8 or 10 yr. level); Formboard (3 levels: Binet 2-6 yr. level, Witmer Formboard, Witmer Cylinders); Repeating digits forward; Repeating digits backward.

Orientation was determined through an interview situation. Tests were administered by Miss Della Rebish, Psychologist.

Conclusion

Histamine phosphate administered to individuals suffering from cerebral arteriosclerosis produced no beneficial affect from a psychiatric or psychological viewpoint.

2. Four patients of this small group showed evidence of coronary occlusion. This would suggest that the use of histamine in cases with evidence of arteriosclerosis is dangerous.

3. The marked fall in blood pressure suggests that histamine may be of some value in essential hypertension to prevent an impending cerebral accident. It is our intention to have a preparation of histamine in an oily vehicle made up and endeavor to produce a less rapid and longer lasting fall in the blood pressure.

Magical Thinking and Ritual to Preserve Omnipotence

As Demonstrated in Cases of Compulsion Neurosis

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The compulsive character is found in that individual who is driven to perform acts and to entertain ideas which he realizes are morbid and out of contact with reality. These acts may or may not be socially useful. When the acts are useful we have very productive works in the arts, the sciences, and in industry. When the acts are completely meaningless with regard to social reality, we have the compulsive neurotic. Compulsive character includes thinking as a form of acting, so to speak; therefore, the one term can be used to include all those individuals suffering from obsessions, compulsions, and phobias—types of behavior that are so closely allied that they must have some similar explanation.[1]

The reason for discussing the term is to indicate how widespread may be the influence of the mechanisms behind compulsion. The compulsion neurosis is a form of malady fairly common in the psychiatrist's practice, while persons with obsessions and phobias are even more common, but if the man who is forced to work overtime and succeeds, as well as the man who because of his unusual acts is mentally ill, are both found to be impelled by the same forces, then the influence of the sources of compulsion is indeed widespread. It is obvious that the causes of the compulsive character are also the causes of many of the usual and commonplace occurrences in everyday living. Many forms of so-called civilized behavior may be fostered on the majority of people as the thing that is proper, when after all they are only the methods of working out the underlying mechanisms of the minority with compulsive characters.

Masserman in his glossary of psychiatric terms defines the neuroses as a group of behavior disorders representing suboptimal adaptations to biodynamic stress and conflict.[2] Neuroses are characterized symptomatically by: 1) anxiety with its recurrent physiological manifestations, more or less covered by 2) various pervasive defenses and fixations such as phobias, obsessions and compulsions, or 3) by symbolic bodily expressions, such as sensori-motor (hysterical) or organ-neurotic (psychosomatic) dysfunctions. If this definition is added to the delineation of the compulsive character given above, a fairly definite description of the type of behavior under discussion arises; namely, a type of behavior in which anxiety is more or less covered by various forms of pervasive defenses and fixations, such as phobias, obsessions or compulsions, which defenses are recognized as morbid and out of contact with reality, yet may or may not be socially useful.

Studies of the compulsive character, as such, have not been so numerous, but ex-

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tensive work has been done on the obsessive-compulsive neuroses. The psychoanalytic formulation of this disease may be presented in brief form as follows: the personality while developing has some difficulty getting through the anal-sadistic stage and into the phallic level of development. This difficulty is sufficient to fix at this level only a small portion of the libido. The psychosexual development then proceeds from the ambivalent pregenital phase to the phallic and enters into the oedipal situation. Here there is difficulty perhaps, such as a severe castration threat. There is then a regression to the anal-sadistic level. This regression may involve only a slight amount of libido, so that genitality is sufficiently preserved to enable puberty to be passed without incident. The person goes on to develop later in life, however, a compulsion neurosis when the oedipal threat is again encountered.

This type of reaction represents the acute compulsive neurosis which comes on later in life, while the chronic form which is much more frequent, according to Fenichel,[3] starts with slight compulsion symptoms at the time of the oedipus complex formation, with compulsive rituals during the latency period, and definite compulsion neurosis in adolescence, when it is continuous, but when also particular external circumstances may precipitate exacerbations from time to time. What happens in either case is that when the neurosis appears there is a regression to the anal-sadistic level. The super-ego rages against these anal and sadistic instinctual demands, the more because it has become more anal and sadistic since it also has been involved in the regression. This in turn makes the genital wishes of the oedipal situation which are still extant more horrible. Thus the poor sufferer attacks himself for his anal-sadistic thoughts and feelings as well as because of the incest wishes which naturally arise when he is trapped in the oedipal conflict.

To escape this turmoil he uses the mechanisms substitution and displacement which account for many of the obvious symptoms so painful to behold. Also because the neurosis which occurs in later life is based on an earlier conflict when the patient had regressed from the genital period back into the pregenital area where the libidinous drives are ambivalent, the neurotic is overcome by obsessive doubts, and each action meets a counter-action. His behavior is also colored in another fashion. Since this difficulty arose so early in life the person meets it with the type of thinking that the infant used. He flees from the world of reality by using the processes he used as an infant to ward off the danger of the fearful outer world. These processes he uses are those of ritual and magic. The first words in infancy are magical and omnipotent, according to Fenichel,[4] while Freud points out that the compulsive while he underestimates the power of thought within himself, he overestimates the external force of thought in similar fashion.[5] The compulsive indeed does and un-does acts by magical words and ritual which give him supernatural powers.

The concept of the omnipotent feelings which are said to inhabit the subconscious of all of us develops in the following fashion: the child when born and for some months afterwards is unable to distinguish between self and non-self. It, therefore, feels in charge of everything. As it is restricted by the regulations of feeding and of bowel movements, this feeling of environmental control is also restricted. It then manages to continue the feeling of all-powerfulness by identification with the mother. The mother is all powerful, the mother belongs to the child, and therefore the child is all powerful.

Later the feeling is maintained by the addition of the father, or of anyone else in the environment who seems to be in charge. As the child grows into the adult, there is still within its subconscious, which is timeless, the feelings of childhood as real as they were in the beginning, so that this concept of being in charge of the universe is still maintained. It is from this that we as adults get the idea that while other people may have accidents, accidents cannot occur to us. We are terrifically upset when some untoward event involves one of our family, because while we are aware from the papers

that many other people are being affected every day, we cannot conceive of anything like that happening to us or to ours. Also when any adult investigates his basic feelings, the ancient interpretation of the universe arises and he cannot help but feel that perhaps after all he is the center and the universe exists because of his thoughts regarding it, and that if he were blotted out it would all disappear. It is almost impossible for a person to conceive of his own obliteration, hence the need of his ideas of immortality. Magic denotes that type of behavior which supervenes natural laws and exists in a realm other than that commonly known as reality. Magic words or deeds are therefore supernatural. They are the stepping stones by which we construct and continue the concept of omnipotence.

The normal individual when a child is made supernatural by means of words. He has the power over life and death. Words can kill. "Bang, you are dead!" Think of the bear, and the bear will come. "I am a princess." "I am a horse." By means of cries and movements, then words and acts, and finally by thoughts and dreams, a child is omnipotent. This omnipotence becomes more and more limited as the world closes in, but is continued by the supposed all powerfulness of the adults of the child's environment. Next, as their limitations are recognized, the person formulates a deity. The omnipotence of God then becomes a necessity. This is recognized by the church, so that constantly the existence of the all-powerful God is reiterated. By means of submissive rituals it is made possible for the indivdual to share in this all-powerfulness. By becoming One with God, the individual too becomes omnipotent. By faith he moves mountains; by saying certain words he undoes the laws of nature. He controls the rain and the storms at sea. Through religious ritual and by means of magic words, the omnipotence of the infant is preserved for the adult. It is only when he is really adult and has a clear insight into himself, that without disturbing anxiety he can question the omnipotence of the deity.

The similarity of the relationship of the normal individual and the compulsive to omnipotence has long been recognized. The relation of the compulsive formula to the magical formula of primitive people has often been discussed. Indeed it would seem almost obvious that the reason for the maintenance of many obsessions and compulsions in this type of illness exists because of the need on the part of the individual to maintain security by continuing into adult life an infantile and archaic feeling of his powerfulness. Also it may be possible that in the treating of this disease, too much emphasis has been put on the struggle between the instinctual drives and the super-ego as the fundamental problem, while the real problem is a more profound narcissistic regression to the infantile realm of magic. The question should not be, "Shall I be bad, or shall I be good," as indicated by the psychoanalyst, so much as, "How shall I maintain my omnipotence in face of advancing knowledge."

In order to illustrate the power of ritual and magic, excerpts from a few case histories are given below:

Case No. 3777: A white male 26 years old came into the office last June. He was a student in the Law School and had been disturbed by sudden attacks of anxiety when called on in class. He gave the history of a profound attack of fear when asked by his small daughter the following question: "Who made God?" "I realized it was silly," he said, "but the thought was most disturbing, a horrible thought that I couldn't get away from." His father had died when he was an infant, but his mother had carried on satisfactorily until faced with the problem of her son's masturbation when he was about 10 years of age. It was at this time that the patient first doubted her omniscience. Then later, when he was 12 years of age, a minister visited the home and discussed the question of God in the presence of our patient. It brought up the thought to the boy that there was something indefinite about the matter. Accompanying his doubts about God, he had his first anxiety spell. It was very severe and lasted all night. Following this, he had a few minor attacks, but nothing severe until suddenly faced by his own daughter with this to him insoluble question regarding the fatherhood of God, when insecurity filled him with terror.

Case No. 192,391: A graduate from Medical School who has been under treatment for chronic compulsion neurosis since May 15, 1946, gave the following on free association: he stated that he now remembers that when he was very small he

thought the whole world was put here for his benefit, and that everything revolved around him. He thought that since his mother and father solved everything in relation to him, that the rest of the world must be the same. About the age of 10 he came suddenly into the realization that this was not entirely true. He still had a feeling that if he, himself, thought something, that it was bound to happen. He was always pointed out as the perfect child. At the time of his illness in adult life, he still felt he had maintained this perfection. He also had some peculiar feelings about the relationship of himself to God. Among many other things he felt that if he did not flush the toilet stool, God would get dirty. It would seem that with the failure of mother and father, he had identified himself with God. The same patient after three months of work with him explains his thinking as follows: "Things do happen every day. As they usually happen, they are accidental as a rule, but I feel if I thought something and meant it, if it did happen, then it would be my fault." He goes on to say, "No, I wouldn't cause it by thinking it. It is merely that if I thought it and wanted it to happen, however accidentally it might be, I would feel like I had done it and had meant it. I realize that intellectually this is absurd." He further says, "My need for perfection is not as great, but I still have to go out of my way to keep my actions in any situation from setting a bad example, or in any way giving someone else the wrong idea." At the present time his most obvious worry is shall he be good and be a minister (as he does not wish), or be bad and be a doctor (which is his greatest desire).

Smoking like his schoolmates did was to him sinful, since smokers, according to statistics, die sooner than non-smokers. The Bible states that a self murderer could not enter the Kingdom of Heaven. Smoking was self murder, but by tapping the cigarette for a great number of times, he felt that he packed the tobacco enough to filter out the nicotine and thereby eliminated the sin, so that he could go ahead and smoke. This tapping process has become a ritual which he is compelled to carry out before each cigarette is lighted. This patient also feels that unacceptable thoughts, such as hostile wishes towards his wife or father, are rendered harmless if he looks at a shiny object which is "pure and unblemished." By so doing, he undoes his sinful deed.

This patient also illustrated two other characteristics of the compulsive—the dread of finality, and the need to return to the same spot and the same attitude to take away a bad thought by thinking or saying the good one. At his mother's funeral while looking at the body, the thought flashed through his mind, "You dirty so and so." The coffin then disappeared in the ground. Since that time he has suffered greatly because the finality of death does not permit him to get back into the same position to think the correct thought and thus undo his former wicked one.

This patient preserves his perfection and his relation to the deity by using the magic words, "I don't mean this." If he says these words, he then can go on to say anything with a secure feeling, since he feels that his words have blotted out the danger like a person who keeps the fingers crossed, or the individual who makes the sign of the cross in the presence of the one with the evil eye.

Case No. 229,240: A girl of 18 has been under observation since June, 1946. She preserved her omnipotence by the following formula: there was some poisonous spray on the trees in the apple orchard. This spray may have gotten on her clothes. She went to a party where she said she met a girl who taught a Sunday School class which her girl friend attended. This teacher whom she had met at the party may have greeted her girl friend with a hand shake at the Sunday School. The girl friend had a boy friend, who may or may not have visited the girl friend during the week. The boy friend's mother had a stroke and died. The patient felt that she was guilty for putting the poisonous spray on this woman in this devious fashion. The spray may have killed the mother of the girl friend's boy friend, she thought, although she knew that the woman died from a stroke.

This girl who is a swimming teacher also felt to blame because she wasn't friendly to girls from Texas while she was at college, because she might have gone to Texas with them, and then have taught a lot of people in Texas how to swim, so that during the recent flood at San Antonio many persons would have been saved from drowning. This girl says, "I have faith in God all right, but so many things happen all the time that I am not going to take a chance." She is afraid for any of the other women on her ward to go down the street to get their hair fixed because they would think so much of the hair-do they would step out in the street in an absent-minded fashion to be run over. Thus, she illustrates generalized hostility and feelings of omnipotence.

Case No. 230,031: Mrs. V. W. has had severe compulsion neurosis since childhood. Her washing mania involves her whole life. The following is her routine according to her own description: Morning ritual—wash hands three times, use bed pan, wash hands three times, wash arms three times, wash hands three times, wash lips three times with water only, wash hands three times, wash eyes three times with water, hand-arm-hand ritual. She eats breakfast standing at the table. The nurse serves sugar and cream. She uses the spoon only and holds it with a paper napkin. She picks up cups and glasses with paper napkins. She uses her fingers for any food that cannot be cut with a spoon. She seldom eats bread because it has touched the tray. She can pick up grapes. She cannot pick

up apples, bananas, oranges or pears, and feels that she cannot peel them.

After breakfast she washes her hands three times. She then brushes her teeth. She washes her hands three times, and also her arms if they should touch her face. Then she goes back to bed until the next meal, or until she must use the bed pan. Throughout the day she cannot sit in a chair unless it is draped with a sheet. She cannot touch the part of the sheet that the nurse has touched. If she does, she must wash three times. This is also true of her bed. She can get back into the bed if she is sure that she need not touch the same place. Nothing she can touch without washing except her finger tips. She is especially uncomfortable if her legs touch each other. She does not wash them, but feels very dirty. She washes four times instead of three after urinating or defecating. Her shoes are especially dirty. She must wash if she touches any part of her body except her finger tips. She washes after putting on each article of clothing, so she seldom dresses. If she does dress, she wears only a slip and dress to shorten the washing process.

Things that are especially difficult to touch are: pencils, scissors, needle and thread, and nail file. She never files her nails, but just tears the nails back with her fingers. She cannot touch paper towels after discarding the outer layers, or paper cups. She feels that paper napkins are not clean, perhaps because of the way they are packed. She turns on faucets with a paper napkin, washes her hands three times, and then lets the water run. The only germ mentioned is T.B., and she cannot clarify this. She just feels better if she washes. She admits that the germs she fears have supernatural powers and cannot be real, yet because of them she shuts herself in her room with locked doors. These germs could certainly represent the world crowding in on her life, while she maintains complete control of her immediate environment through her rigid ritual and taboo. The doctor or nurse who enters the room is completely dominated by her rules for behavior.

Case No. 3847: A woman of 54 complained of severe anxiety attacks occurring over the last six years. She had developed a compulsive character in early life and even now must undo practically any act. If she mails a letter, she immediately returns to get it out of the post office. She can't ride on a train or in an airplane because after she starts she can't go back. Her father deserted the family when she was quite young. She was taught to hate the father. Her hostility spread from the father to all men. She loved and also hated her mother. She states she never loved her husband and doubts the existence of true affection for her daughter. It would certainly seem that she was forced by her oedipal conflict to regress to the level of anal-sadistic traits, so that they have colored her entire love life. This lady was raised a strict Episcopalean after her mother's death when the patient was 17. She became very religious and had a supreme faith in God. She went into Christian Science for relief. She lost faith, began to be seized by severe attacks of anxiety. She now doubts the existence of a deity. If He does exist, He has nothing to do with this world. "Look at the atom bomb; a God could not let that happen." Her compulsions, her doubts, and her anxieties indicate the attempts to maintain omnipotence and the terror instilled by the consciousness of its loss.

It is true that some of the behavior of these patients might be considered as reaction formation to feelings of guilt over hated unconscious joys. Indeed the reaction formation does parallel the attempts to obtain security through maintaining control over the environment; one type of behavior enhances the other, does not take the other's place in the total picture. Our effort is to show that while both exist, that the effort to maintain omnipotence through magic and ritual has an important role in the type of activity under discussion. Certainly there is no sharp dividing line between the conscious and unconscious so that while we learn from unconscious activities the meanings of what we do consciously, it is also true that behavior that is used every day in ordinary life is most likely to have its replica in the doings of the unconscious. Hence, it would seem that the rituals and magical thinking of the compulsive were explained by the ritual and magic thinking of everyday life.

No one who has worked with the compulsive character can deny the presence of hostility and sadism. The super-ego certainly most severely punishes the ego, because of both the anal traits and the genital longings. Yet the striving for perfection, the use of magical words, of magical thoughts, the rituals, as well as other forms of doing and undoing, all seem to be based on the need for omnipotence. Isn't it possible that this need which is felt to a certain degree by all mankind may be so grossly exaggerated in this disorder that it becomes the fundamental cause for the malady?

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Neurological Clinical Pathological Conference

of the

Cincinnati General Hospital

MILTON ROSENBAUM, M.D., *Editor*

CASE NO. 451173

Presentation

The patient, a forty-seven-year-old male, was first seen by a neurologist on October 2, 1945. The patient stated that his present illness began about two years before, the first complaint being dizziness. His occupation was that of a structural steel worker, but during the last two years he had been forced to work at ground level only because of dizziness. He had never had true vertigo. He complained of feeling top-heavy and complained of staggering when he walked. At the onset of his illness two years ago he had noted numbness of the left face. This numbness gradually spread to the entire left side of the body. One year after the onset he noted weakness of the left leg, progressive type, evidenced by dragging of the left foot. At times when he was dizzy, he had noted a transient diplopia which was more marked when he looked toward the right side. He had noted inco-ordination, especially when he attempted to turn suddenly while walking. During the last year of the illness he had noted frequency of urination but had never experienced loss of bladder control. At times he had noted tinnitus in the right ear which he described as a singing sound. He had had no convulsions, headaches, hallucinations of taste or smell, visual or auditory hallucinations.

Past medical history was unimportant in so far as the present illness was concerned except for two facts: 1. The patient had had several attacks of trifacial neuralgia four years before the first neurological examination; 2. He had had a radical mastoid operation on the left side, and following this his hearing became impaired on the left side.

General physical examination was negative except for a left mastoid surgical scar and a perforated ear drum on the left side.

The initial neurological examination on October 2, 1945 was as follows: Cranial nerves, sense of smell normal. Vision was 20/30 in the right eye, 20/40 in the left eye, corrected to 20/20 in both eyes. Patient was able to read the finest test print. Visual fields were normal. Opthalmoscopic examination disclosed that the optic nerves were normal as were the retinal vessels. Pupils were equal in size and reacted to light and accommodation. Persistent nystagmus was noted on right lateral gaze. A few nystamoid jerks were noted when the patient looked to the left. The corneal reflexes were diminished bilaterally, a trifle more on the left than on the right. There was hypalgesia and hypesthesia on the left side of the face which was part of a hemi-hypalgesia and hypesthesia of the left side of the body. Taste was diministed on the anteriar two-thirds of the left side of the tongue. There was a hearing loss of the air conduction type in the left ear. Bone conduction was unimpaired and equal. The palatal and gag reflexes were normal on the two sides. Swallowing was normal and the tongue protruded in the midline with no tremors observed. Tests for motor power disclosed a weakness of the left face, arm, and leg. There was slight circumduction of the left

leg in walking. Deep reflexes were hyperactive in the left arm and leg. Abdominals were absent on the left side. A positive Babinski sign was noted on the left side. There was a positive Chaddock on the right.

Patient showed some emotional lability. He laughed too easily and was somewhat euphoric.

Laboratory data: Spinal puncture was performed on October 10, 1945. Initial pressure was 100 mm. of water. Dynamics normal. Fluid contained three lymphocytes. Wasserman was negative. Gold curve 0000000000. There was slight elevation of the protein to 65 mgm. per 100 cc. Blood Wasserman and Kahn tests on October 15, 1945 were negative. X-rays of the skull made on October 1 were entirely normal. Blood count made November 3 revealed 5,000,000 red blood cells. Hemoglobin 14.7 grams. White blood cells 7,600, polymorphs 88%. Urinalysis on November 3 disclosed acid reaction, specific gravity 1,020, no albumin or sugar, and microscopic examination was negative.

Course: On November 2, 1945 patient entered the hospital for further study. It is stated in the record that there was no sensory loss and no nystagmus. On November 5, 1945 pneumoencephalography was attempted but the filling was inadequate after withdrawal of 120 cc. of fluid. Following this procedure burr holes were made, but the ventricles could not be located and the procedure was discontinued. In November 6 the patient complained of blurring of vision, and it was noted that there was a left homonymous hemianopsia. Ventriculography was successfully carried out on November 8. The interpretation was as follows: The lateral ventricles were shifted three millimeters to the left of the midline. They were of normal size. There was a suggestion of flattening of the superior surface of both lateral ventricles. In the lateral views there was an apparent local depression of the right ventricle at portions two and three.

On November 9 a right fronto-parietal craniotomy was performed. The immediate post-operative course was good until November 11, on which date the patient became somnolent and showed progressive weakness of the left arm and leg. The course of the illness continued down hill. He complained of coldness and inability to move his extremities.

Ventricular puncture on November 10 released clear fluid under normal pressure. The patient expired on November 11.

Differential Diagnosis

Dr. Milton Rosenbaum: This case vividly illustrates the fact that in the majority of neurological cases the diagnosis can and should be made from the history. The student and many physicians, including neurologists, too often neglect the history depending solely on the neurological and laboratory examinations for the diagnosis. This case also illustrates that in th eorder of their importance in arriving at a correct neurological, diagnosis is first, the history, second, the examination of the spinal fluid, and third, the neurological examination. In this instance I am willing to make the diagnosis on the history alone. Essentially, the history reveals the presence of diffuse neurological symptoms, and despite the impression of a progressive disorder, one can easily spot remissions and exacerbations in the course of this man's illness.

I believe that the illness was initiated four years ago with the attacks of trifacial neuralgia and that those attacks were the initial symptoms of the illness from which the man died. The transient episodes of dizziness and the transient episodes of diplopia, plus the disappearance of the nystagmus and the left hemi-hypalgesia and hypesthesia point to the diagnosis of multiple sclerosis. If one assume that the neurological examinations carried out on October 2, 1945 and November 2, 1945 were accurate, then there is no other explanation for the changing neurological picture than multiple sclerosis. The diffuseness of the neurological lesions is evidenced by the numerous signs and symptoms pointing to involvement of various parts of the central nervous system. Signs and symptoms such as bilateral diminished corneal reflexes, numbness of the left face, and transient diplopia point to brain stem involvement. The dizziness and

staggering suggest cerebellar or cerebellar tract lesions, while the emotional lability and euphoria suggest basal ganglia and cerebral lesions, and the urinary symptoms suggest spinal cord involvement. The rather progressive type of left hemiplegia and left hemi-hypesthesia would make one think of a cerebral lesion in the nature of a neoplasm, but it is known that such findings can be associated with multiple sclerosis.

In the differential diagnosis one would have to consider the possibility of an infiltrating glioma of th e brain stem and a right-sided cerebral neoplasm. Against both of these diagnoses would be the prolonged course of the illness and the presence of diffuse symptoms. Also against the diagnosis of a cerebral neoplasm would be the normal pressure of the spinal fluid. The negative gold curve does not rule out multiple sclerosis since 75% of patients with multiple sclerosis have a negative gold curve. It is quite apparent from the protocol that a brain tumor was suspected and this diagnosis seemed highly probable because of the findings on ventriculography which then led to the operation and death. Perhaps it may be odd to so lightly reject the findings of the ventriculography, but it would seem to me that a shift of 3 mm. to the left of the midline is a rather minute finding and may well have been due to a technical error in the taking of the x-rays. I think it was unfortunate that when the ventriculograms were done, the fluid from the ventricles was not sent to the laboratory for determination of the total protein. Such a maneuver may be of extreme help in diagnosing a tumor and also in localizing it. If you remember, the total protein in the lumbar spinal fluid was 65 mgm., and if proteins were determined on the ventricular fluid and the protein in one ventricle was markedly higher than in the other, such a finding would have pointed to a neoplasm near the ventricle with the high protein. This maneuver has been stressed by Dr. H. Houston Merritt but it is often neglected by neurosurgeons.

Following the ventriculogram the patient developed a left homonomous hemianopsia. This finding might represent a new placque associated with the multiple sclerosis, but more likely, it resulted from trauma associated with the needle puncture in carrying out the ventriculogram. Such complications are known to occur following ventriculography.

I believe that the diagnosis in this case is multiple sclerosis and that placques will be found in the brain stem, cerebellum, and in the white matter of the cortex.

Dr. Joseph P. Evans: I believe that the slight shift to the left of the lateral ventricles seen in the ventriculograms was more apparent than real and was due to the fact that the head was not exactly in the midline when the x-rays were taken. I would agree with Dr. Rosenbaum's opinion that the left homonomous hemianopsia which this man developed after ventriculography was due to bleeding in the optic pathways following the insertion of the ventricular needle. This is a well known though infrequent complication of ventriculography.

Clinical Diagnosis

Pre-operative: Parasaggital meningioma —right side.

Post-operative: Probable cerebral thrombosis of right frontal area.

Dr. Rosenbaum's Diagnosis

Multiple Sclerosis.

Anatomical Diagnosis

Multiple Sclerosis.

Discussion of Pathology

Dr. I. Mark Scheinker: The outer surfaces of the brain appeared grossly normal. On coronal section through both hemispheres at the level of the optic chiasm there was a pinkish gray circular lesion of about 3 mm. in diameter, lying in the central portion of the white matter and transsecting the fibers of the left pyramidal tract converging toward the internal capsule. The lesion showed the characteristic features of a sclerotic plaque. Similar lesions were found in the vicinity of the right lateral ventricle wall and also adjacent to the posterior horn involving the region of the left optic radiation. In addition, there were a few small sclerotic plaques in the crossing fibers of the pons, in the floor of the fourth ventricle and in the left brachium conjunctivum.

The microscopic examination disclosed findings characteristic of a chronic form of multiple sclerosis. In preparations stained for myelin sheath by the method of Leyez, there was a complete loss of myelin sheaths throughout the plaques. Bodian silver impregnation method disclosed a marked preservation of the nerve fibers. There was pronounced glial proliferation and very few signs of an inflammatory reaction.

Only a few of the smallest plaques showed the presence of thrombotic veins as described by Putnam, Daw and Berglund and by Scheinker.

Coronal sections through the right occipital lobe revealed a small group of coalescent hemorrhages probably secondary to needling involving the optic radiation and ventricular wall.

Group Psychotherapy

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The psychotherapist in the military organization must orient himself to the total picture of the patients who come under his care bearing in mind the following four main personality facets common to all military personnel:

(a) His adjustment to military life—meaning an interpretation of the previous personality adjusting to the new military environment.

(b) His inter-personal relationships with officers and men.

(c) His actual combat stress.

(d) His attitudes about the "people back home"—the sociopsychological factors.

It is not at all accurate to say that one or other of these factors results in the breakdown for it is usually some combination. For example, it has been noticed that a great number of our patients break down weeks or even months after they returned from a combat area, at home during leave when the patient feels the great forces of separation from his combat unit plus much hostility toward the home front where he finds unequal sacrifice and stratification of patriotic feelings. It is in such a setting that group psychotherapy as one type of treatment must be evaluated for the war neuroses.

A. *Description of treatment method:*

The patients treated at the U. S. Naval Hospital, Convalescent Annex, Swarthmore, Pa., all have the diagnosis of combat fatigue or operational fatigue. They are carefully selected by the neuropsychiatric staff of the U. S. Naval Hospital, Philadelphia, Pa., in order to eliminate the border-line psychotic, the mental defective, and the psychopath. In essence the patients have the same diagnosis, are all young males, and have similar precipitating causes.

Each patient is interviewed twice before admission to a group in order to establish rapport, to give the medical officer an opportunity to know the patient's personal history and the development of his illness, and to prepare him for group treatment. The group psychotherapy is one part of an active daily program that includes physical training, educational therapy, occupational therapy, and recreational therapy. These activities are designed to be interesting, stimulating, and pragmatic.

They are divided into groups of approximately 10 to 14. After experimentation with smaller and larger groups this number was decided upon because too large a group results in less opportunity for active participation by each patient, thereby becoming too impersonal. Also patients are inhibited in achieving identification within a large group as well as stifled and embarrassed in their attempts to talk in front of many peo-

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ple. Too small a group results in the loss of opportunity for each patient to experience varied affects released in a larger group.

The group sessions are planned but flexible, the type of session largely dependent upon the character of the group. Not all the groups are similar, the variation being dependent upon the proportion of aggressive and passive members, the intensity of the illness, and the presence of accepted leaders, such as chief petty officers. The therapist must therefore evaluate his group as well as the individual patients and direct his therapy accordingly. Some groups need freedom of expression, others need didactic talks or prodding, while other groups are more open to suggestion. The aggressive group requires a good deal of freedom of expression with control. The non-verbal, passive group needs pushing and more direct discussions.

Sessions should be held not more than three times a week since too many result in boredom and a let down of interest. If less frequent than three a week, the continuity of the treatment is broken. Each session generally includes a short talk on a specific subject such as fear, anger, and the relationship between body and mind, preceded or followed by an open and free discussion. The essential characteristics of such a talk should be brevity, simplicity of language, and many examples of essential points. These may be reenforced by blackboard illustrations and charts, and specially prepared therapeutic films. Stimulating, appropriate questions relating to the subjects are essential and serve as an excellent medium for controlling and directing the sessions.

B. *The psychodynamic principles:*

All the accepted methods in individual therapy are used in group therapy, such as catharsis, suggestion, desensitization, re-education, and transference. In addition, certain forces function in the group that are specific for group therapy, particularly group identification. Another force operating is socialization through group activities and the sharing of daily work and experiences. The sessions are all controlled, not too penetrating, and repetition for reenforcement is constantly used. The procedure is essentially an objective one—a direct form of therapy—utilizing intellectualization as the means of modifying emotional reactions. It is mainly because of this latter force that skepticism has grown up about the procedure. However, there cannot be complete separation of intellect and emotion in psychotherapy of any type in spite of concepts to the contrary.

Group identification attacks specifically one of the contributing forces that causes combat fatigue, that is, the breakdown of group sense or morale. Group identification is hastened at Swarthmore since all the patients are combat men with a mutual sense of kinship with other combat men.

C. *The therapeutic aims:*

An attempt is made to attack the two common denominators of combat fatigue: (1) anxiety, mainly expressed as uncontrollable aggressiveness and bodily symptoms, and (2) depression. These are attacked by utilizing means to strengthen the man's self-esteem, by re-establishing group feeling, and finally by bringing about insight. These aims are furthered by the explanatory talks, by allowing all to examine aggressiveness, discussing it as they find it in their fellow patients, and lastly by actively working in a therapeutic program that encourages release of aggression, good morale, creative activity, and distraction from moodiness, dissatisfactions, and phantasy formations.

D. *The role of the therapist:*

In group therapy the therapist assumes many different roles. Through the forces of transference he becomes the source of support, inspiration, and information, and moulds each patient into the group. He is the sympathetic listener, thereby counteracting the inexorable conscience. To attack the main sources of disabling guilt feelings, the medical officer must modify the persistent strong identification with the dead "buddy" and the detached combat unit. The therapist must also counteract and desensitize these patients from certain hostile fig-

ures in their phantasy formations. These include previous inept, inconsiderate officers, officers who "took too many chances," commissioned and non-commissioned officers who sent them off to die, and the "people back home" who forced them to feel expendable and then let them down by becoming war workers, strikers, and war profiteers.

E. *Personal observations:*

Group psychotherapy has particular usefulness and is ideal for military life where group living and group interactions constitute the normal environment. It is an excellent method for presenting preliminary material necessary for any form of psychotherapy, such as simple psychological language and the physiological explanation of symptoms.

In the group patients are more accessible to certain forms of forceful suggestion, as demonstrated by patients using themselves as examples of some psychological truths and by the group approbation or disapproval of ideas and behavior.

In group therapy non-communicative patients who are too restive for individual therapy seem to get support and relief from listening to others talk, expressing their own ideas.

Patients in a group may express much more emotion than they would if seen individually; that is, they may be "whipped up" by the expressions of others—a commonly observed phenomenon in gangs, crowds, or mobs. Frequently, patients break down and cry during the session; the therapist must be careful to control the amount of emotion he wishes released. Emotional outlets are not necessarily repressed by the presence of a group and occasionally such expressions are shown without any more embarrassment than when being interviewed by a doctor alone. In fact, it is easier for some to express certain emotions because of the ready identification with the same emotion found in others, particularly true of feelings of hostility and depression. It is also true that in group therapy an excellent opportunity is afforded the medical officer to observe his patients when they do not realize that they are being observed—of great value for evidence of too much preoccupation, overwhelming aggression, social inhibitions, and hypomanic trends.

F. *The results:*

The results of treatment in this highly selected group are based on three criteria: (1) the ability to return to duty; (2) relief from symptoms; and (3) the follow-up by means of a carefully prepared questionnaire. There are many difficulties in estimating our results due to group sessions per se, since the type of treatment described and utilized is a combination of individual psychotherapy, frequently using narcosynthesis, supportive therapy such as subshock insulin, a daily program of activities and group psychotherapy. The general impression gained from personal interviews and the questionnaire follow-up is that most patients found the group sessions beneficial and profitable. The average period of treatment is eight weeks.

Six hundred fifty-one patients were treated at Swarthmore since November 1943. Of this number 40% were returned to duty, the vast majority to limited shore duty. Improvement in symptoms was found in approximately 70%.

G. *The significance and possible applications of group therapy:*

For military and postmilitary psychiatry, group therapy is another valuable part of the psychiatric armamentarium because it affords a method of therapy for large numbers of the emotionally ill. It is ideal in the military environment in the treatment of the combat-induced emotional disorders. It should have a great value in the therapy at Veteran's Hospitals, in city hospital clinics and in State institutions where the problem of large numbers of patients and the small trained staff are ubiquitous.

It should also be of remarkable use in the teaching institutions for teaching psychotherapy to students and doctors. However, its limitations must be recognized since it is not suitable for all patients and generally requires coexisting individual therapy.

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Nomination of candidates for the 1946 awards should be submitted by September 10 with full supporting data in triplicate to Dr. George S. Stevenson, The National Committee for Mental Hygiene, 1790 Broadway, New York 19, New York.

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